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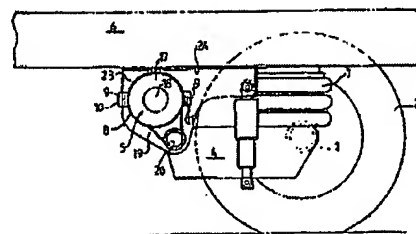
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(54) Axle with Two Independent Wheels Having a Crosspiece-Reservoir

(57) The axle with independent wheels according to the invention is of the type including two coaxial half-shafts (1) each bearing at least one wheel (2) equipped with a braking device, two caissons (4) on which the half-shafts are mounted for rotation, these caissons being articulated on a crosspiece (5) intended to be attached to a vehicle chassis (6) notably a heavy truck, and two pneumatic suspensions (7) mounted on the caissons so as to support the chassis when the crosspiece is attached to them.

It is essentially characterized in that the crosspiece is made up by a compressed air reservoir having a cylindrical side wall (8) provided with orifices (9) connected respectively to at least one inlet conduit connected to a source of compressed air and to at least two outlet conduits respectively connected to the braking devices and the suspensions (7).

The invention makes it possible to reduce the response time of the braking devices and improve safety.



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EXHIBIT 2

## 1.

“Axle with Independent Wheels Having a Crosspiece-Reservoir”

The present invention relates to an axle with independent wheels of the type including two coaxial half-shafts each bearing at least one wheel equipped with a braking device, two caissons on which the half-shafts are mounted for rotation, these caissons being articulated on a crosspiece intended to be attached to a vehicle chassis notably a heavy truck, and two pneumatic suspensions mounted on the caissons so as to support the chassis when the crosspiece is attached to them.

The pneumatic braking and suspension devices for heavy trucks which have axles with independent wheels are supplied with compressed air from tanks of fairly significant size. Now, since these tanks are bulky, the manufacturers are currently lead to install them some distance from the axles and consequently to connect them to the braking devices by long conduits. Such conduits all the same have the disadvantage of extending the response time of the braking devices, which can cause serious safety problems.

The present invention proposes to remedy this disadvantage and, to do that, its subject is an axle with independent wheels of the aforementioned type, wherein the crosspiece is made up by a compressed air reservoir having a cylindrical side wall provided with orifices connected respectively to at least one inlet conduit connected to a source of compressed air and to at least two outlet conduits respectively connected to the braking devices and the suspensions.

The proposed solution makes it possible to reduce the length of the conduits connecting the reservoir to the braking devices and therefore lower their response time and improve safety. Further it makes it possible to free up the location which was reserved for the compressed air tanks and offer them to other functions.

## 2.

Preferably, the orifices laid out in the lateral wall of the reservoir are threaded and receive by screwing the pneumatic valves through which said reservoir is connected to the different conduits.

Since the pneumatic valves are set directly against the reservoir, they have little bulk and are easily accessible, which is particularly advantageous on the chassis of underslung vehicles on which free space is very limited.

It is desirable that the reservoir enclose at least one tube crossing its lateral wall in a sealed manner in two opposed locations.

This tube can be used to make it possible for a long element such as a cable or conduit to cross the reservoir rather than going around it. It can therefore make it easier to place this element and avoid giving it excessive lengths.

According to a preferred method of implementing the invention, the reservoir has two rounded ends integrated with its lateral wall at least one of which is provided with a removable cap.

Through its rounded ends, the reservoir is capable of resisting intense mechanical stresses and high air pressures. Further, through its removable cap, it is possible to regularly perform an internal examination of its welds, coating, etc. in order to avoid any risk of accidental failure.

The axle with independent wheels conforming to the invention is further characterized in that each caisson is articulated on two coaxial pivots carried by two fixed feet on the lower part of the reservoir's side wall.

Further, so the reservoir can be easily attached to the chassis, it is desirable that it have two supports projecting from the upper part of its side wall, the supports having a bearing surface on which the chassis is likely to press.

According to another characteristic of the invention, the two end legs are adjacent to the reservoir's extremities and are extended to its upper part by the two supports.

## 3.

The end legs and the supports constitute two types of binding bands further reinforcing the reservoirs stiffness.

A method of execution in the present invention will be described below as a strictly non-limiting example by referring to the attached drawings in which:

- Figure 1 is a schematic side view of an axle with independent wheels conforming to the invention; this axle supports a vehicle chassis, notably a heavy truck.
- Figure 2 is a schematic top view of the axle with independent wheels visible in Figure 1. ;
- Figure 3 is a front view of the compressed air reservoir constituting the axle's crosspiece.
- Figure 4 is a cross-section view along the line IV-IV from Figure 3.

The crosspiece with independent wheels which can be seen in Figures 1 and 2 includes in a well-known manner two coaxial half-shafts 1 each bearing two twin wheels 2 equipped with a braking device 3, two caissons 4 on which the half-shafts 1 are mounted for rotation, these caissons being articulated on a crosspiece 5 on which the vehicle chassis 6 rests, and two pneumatic suspensions 7 extending between the caissons 4 and the chassis 6.

In conformance with the invention, the crosspiece 5 is made up of a compressed air reservoir with a cylindrical lateral wall 8 provided with threaded orifices (designated by the reference 9 Figures 1 and 3), in which are screwed to pneumatic files 10, 11 and 12.

The valve 10 is connected to an inlet conduit 13 connected to a source of compressed air (not shown) such as the compressor whereas the valves 11 and 12 are respectively connected to outlet conduits 14 and 15 connected first to the braking devices 3 and second to the suspensions 7.

Here it is specified that the valve 10 allows for filling the reservoir with compressed air and checking the internal pressure, and that the valves 11 and 12 are themselves for controlling the braking devices or suspensions.

## 4.

The reservoir is traversed by two tubes 16 whose ends are welded to its lateral wall; these tubes are intended to provide a passage for long elements such as cables or tubes.

The two ends of the lateral wall 8 of the reservoir are closed by two rounded ends 17 one of which is provided with a cap 18 (visible only in Figure 1) capable of being easily removed so an examination of the welds and internal coating can be done if necessary.

On the lower part of its lateral wall, the reservoir has two outer legs 19 each provided with a pivot 20 and two intermediate legs 21 each provided with a pivot 22.

The pivots 20 and 22 are coaxial and support for swiveling the caisson 4; each caisson is articulated on one pivot 20 and one pivot 22.

Additionally the reservoir has two supports 23 projecting from the upper part of its lateral wall; these supports have a bearing surface 24 against which the chassis 6 is anchored by bolting.

Here it should be noted that the outer legs 19 and their supports 23 encircle the reservoir in the area of its ends and reinforce its resistance against mechanical stresses and pressure from the compressed air.

After the preceding, it can be easily conceived that the present invention makes it possible to reduce the length of the conduits, directly supplying the pneumatic valves, reducing the response time of the braking devices, and achieving gains of weight and bulk, which is particularly interesting in the caisson of vehicles with underslung chassis.

5.

CLAIMS

1. Axle with independent wheels of the type including two coaxial half-shafts (1) each bearing at least one wheel (2) equipped with a braking device (3), two caissons (4) on which the half-shafts are mounted for rotation, these caissons being articulated on a crosspiece (5) intended to be attached to a vehicle chassis (6) notably a heavy truck, and two pneumatic suspensions (7) mounted on the caissons so as to support the chassis when the crosspiece (5) is attached to them wherein the crosspiece is made-up of a compressed-air reservoir having a cylindrical lateral wall (8) provided with orifices (9) respectively connected to at least one inlet conduit (13) connected to a source of compressed air and at least two outlet conduits (14 and 15) connected respectively to the braking devices (3) and the suspensions (7).

2. Axle with independent wheels according to Claim 1, wherein the orifices (9) laid out in the lateral wall (8) of the reservoir are threaded and receive by screwing the pneumatic valves (10-12) through which said reservoir is connected to the different conduits (13-15).

3. Axle with independent wheels according to Claims 1 to 2, wherein the reservoir encloses at least one table (16) crossing its lateral wall (8) in a sealed manner at two opposite locations.

4. Axle with independent wheels according to any one of Claims 1 to 3, wherein the reservoir has two rounded ends (17) integrated with its lateral wall (8) and at least one of which is provided with a removable cap (18).

5. Axle with independent wheels according to any one of Claims 1 to 4, wherein each caisson (4) is hinged on two coaxial pivots (20 and 22) borne by two legs (19 and 21) attached to the lower part of the lateral wall (8) of the reservoir.

6. Axle with independent wheels according to any one of

6.

Claims 1 to 5, wherein the reservoir has two supports (23) projecting from the upper part of its lateral wall (8); these supports having a bearing surface area (24) on which the chassis (6) is likely to press.

7. Axle with independent wheels according to the Claims 5 and 6 wherein the two end legs (19) are adjacent to the reservoir's extremities and are extended to its upper part by two supports (23).

**FIG. 1**

[See original for art.]

**FIG. 4**

[See original for art.]

**FIG. 3**



**FIG. 2**

[See original for art.]

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PRELIMINARY SEARCH REPORT

prepared on the basis of the latest claims filed before  
beginning the search

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DOCUMENTS FOUND TO BE PERTINENT		Claims relevant to the examined application
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Date search completed:		Examiner
March 19, 1992		F. VAN DER VEEN
CATEGORY OF THE DOCUMENTS CITED		
X: particularly pertinent on its own Y: particularly relevant in combination with another document in the same category A: pertinent to the background of at least one claim or general technology background O: unwritten disclosure P: document insert		T: theory or principal underlying the invention E: patent document having a date earlier than the filing date and which had only been published on the filing date or on a later date D: cited in the application L: cited for other reasons ..... &: member of the same family; corresponding document

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